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Government bonds and global diversification

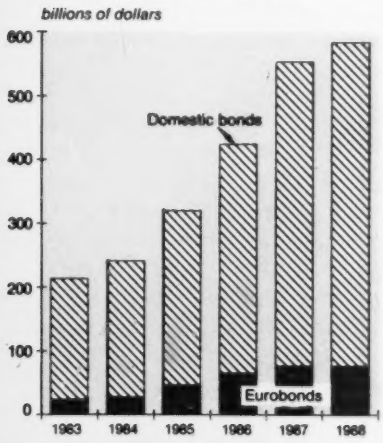
Foreign investors have become major buyers of government bonds in recent years. Cross-border holdings of bonds issued by governments of eleven major countries almost tripled between 1983 and 1988, growing from $213 billion to $583 billion (see Chart 1). The growth reflects continuing efforts by investors worldwide to build up their international securities portfolios.

The globalization of securities markets is being propelled by the compelling logic of diversification and the tearing down of some long-standing barriers to international investment. In the early 1980s, financial deregulation, including the removal of capital and exchange controls, opened up many investment opportunities. As investors probed foreign markets, they became increasingly aware of both the peculiarities and potential of foreign securities, encouraging further investment. In particular, investors learned that foreign assets provide substantial diversification benefits because the returns on foreign assets do not move one for one with domestic returns and thus allow a reduction in overall portfolio risk without sacrificing return. At the same time, additional financial instruments for hedging exchange rate risk became widely available, ameliorating a major concern of international investors.

The increase in international asset diversification can be seen in the context of the $19.3 trillion in bonds and equities issued by public and private entities of eleven major countries in 1988 (see Table 1).* Together these countries report that $1.8 trillion of these securities were held by foreign investors. Given that outstandings in these eleven countries account for close to 90% of world capitalization, these totals can be treated as a close proxy of the global securities portfolio.** By this measure then,

Chart 1

*Cross-border holdings of government bonds**



*Foreign-held bonds issued by governments in Australia, Belgium, Canada, France, Germany, Italy, Japan, Netherlands, Spain, United Kingdom, United States.

*The eleven, consisting of Australia, Belgium, Canada, France, Germany, Italy, Japan, Netherlands, Spain, United Kingdom, and United States, were chosen because of the availability of data on their external position and the attractiveness and liquidity of their capital markets.

**The data are based on what the eleven countries report as external liabilities. For the world as a whole, external liabilities should add up to external assets, permitting one to make direct inferences about investors' foreign asset portfolios. Liability data are used here because they are generally of better quality and provide more detail than asset data. Note that securities

Table 1

Global portfolio size and composition

billions of dollars

	1983	*1985*	*1988*
*Global portfolio**	7,602	10,715	19,341
Equities	3,284	4,667	9,278
Bonds	4,318	6,049	10,063
*Cross-border portfolio***	578	930	1,767
Equities	233	341	619
Bonds	345	589	1,148
Private bonds	132	269	565
Government bonds	213	320	583
*Official holders****	100	125	240
Nonofficial holders	113	195	343

*Total issued by private and public entities of eleven major countries.
**Nonresident-held securities issued by private and public entities of eleven major countries.
***Estimated.

are considered foreign in these data if the investor's country of residence differs from the issuer's, irrespective of currency denomination. Investors, however, may be more likely to classify their holdings by currency than by the residence of the issuer. Also note that the data often do not correctly report the nationality of the ultimate investor. For example, international investment funds operating in London invest for both residents and nonresidents, yet all of these investments are reported as U.K. investments abroad.

9% of the global securities portfolio is invested in foreign securities. This measure of international portfolio diversification is up from 7¼% at the end of 1983, although unchanged from 1986.

These averages mask a great deal of diversity among the countries surveyed. Not surprisingly, investors in smaller countries devote a larger slice of their securities portfolios to foreign assets, as their domestic markets provide only limited diversification opportunities and they have greater need to invest in foreign currency assets as a hedge against imported inflation (see Table 2). For example, Dutch investors, for a long time active in foreign markets, hold almost a quarter of their portfolio in foreign equities and bonds, compared with only 2% for U.S. investors.

Equally without surprise, investors from countries with current account surpluses have diversified into foreign securities faster than investors from countries with external deficits. German investors raised their foreign allocation from 9% to15% during 1983-88, while Japanese investors moved from 4% to 6.5%. Over the same period, U.S. investors kept their foreign share unchanged.

Japanese cross-border investment has been the fastest growing. In 1983, Japanese nonofficial holdings were smaller than the United Kingdom's and just half the size of those of the United States; five years later their holdings were more than double the United States' and, at $431 billion, constituted more than a quarter of world cross-border investment. Even so, with only 6.5% of their securities holdings invested abroad, the Japanese remain less diversified than investors in a number of other countries.

Fixed-income diversification

Over the last five years global investors have steadily raised the foreign component of their bond portfolios, while barely maintaining the foreign share of their equity holdings (see Chart 2). At year-end 1988, foreign equity holdings of $573 billion accounted for only 6.7% of world equity capitalization, down from 7.7% prior to the 1987 stock market crash. While the 1987 stock market crash clearly had a negative impact on investor interest in foreign equities, even before 1987 there was only a gradual upward trend in the foreign share of global equity portfolios.

In contrast to equities, foreign bond holdings have grown rapidly from 8% of total bond outstandings in 1983 to over 11% in 1988, reaching a level of $1.1 trillion. This international diversification has been encouraged by a number of developments, including the availability of new instruments to hedge interest and exchange rate risk in foreign markets (futures, options, and swaps), the removal by many countries of withholding taxes on interest paid to nonresidents, and investor-driven product innovations in the Euromarkets. Equally important have been attempts in Europe to promote new international financial centers by fostering increased competition among government bond dealers, screen-based trading, greater liquidity, and improved settlement procedures.

U.S. investors have bucked these trends, increasing the foreign share of their equity portfolio from 1% to 2%, while lower-

Table 2

Nonofficial holdings of foreign securities by residence of investor

	All securities						Equities			Bonds		
	Billions of dollars			% of resident portfolio			% of resident equity portfolio			% of resident bond portfolio		
	1983	1985	1988	1983	1985	1988	1983	1985	1988	1983	1985	1988
Canada*	9	12	16	4	4	4	5	5	5	1	2	2
Germany	42	69	176	9	10	15	13	10	15	7	10	15
Japan	57	185	431	4	8	7	—	—	—	—	—	—
Netherlands	12	21	46	18	19	22	29	24	25	10	15	21
United Kingdom	88	148	267	19	22	22	22	20	20	16	24	25
United States	83	112	157	2	2	2	1	2	2	3	2	2

*The United States reports Canadian nonofficial holdings of U.S. securities (excluding Treasury bonds) of $38 billion at end-1988, suggesting that closer to 10% of Canadian residents' global securities portfolio consists of foreign securities.

ing that of their fixed-income portfolio from 3% to 2%. This growing interest in foreign equities among U.S. investors may be more a catch-up effect, as they had been underinvested in foreign equities relative to investors in other countries.

Government bonds

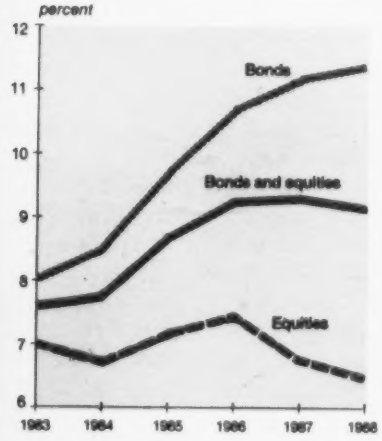
More than half of all cross-border holdings of bonds consists of government bonds, close to 90% of which have been issued in domestic markets, and the rest in the Euromarkets where they are commonly known as sovereigns.* The other half is corporate bonds (including state enterprises), which, except for U.S. domestic bonds, are largely Eurobonds. Although balance of payments data used in this study treat Eurobonds as foreign bonds whenever the issuer is a foreign entity, investors may not always treat them as such. A substantial (but unknown) portion of Eurobonds held outside the country of the issuer's is denominated in the investor's own currency and is thus probably managed as part of a domestic portfolio. German investors, for example, owned more than 20% (DM36 billion) of outstanding Euro-DM bonds issued by non-German entities at the end of last year.

At first glance, investors appear to have a greater preference for government bonds when they invest abroad: government bonds constitute 34% of total cross-border securities investment compared with only 21% of domestic investment. The difference, however, is attributable entirely to holdings of government bonds by central banks as part of their foreign exchange reserves. Official investments in government bonds, valued at around $240 billion at year-end 1988, account for almost half of all foreign-held government bonds. Excluding official holdings, nonofficial investors allocate about the same share of their cross-border securities portfolios to government bonds as they hold in their domestic portfolios.

Central bank investment also explains the apparent attractiveness of U.S. Treasury bonds to cross-border investors. At the end of 1988, U.S. Treasury bonds accounted for about 40% of cross-border holdings of government bonds, significantly higher than their one-third share in global government bond outstandings (see Tables 3 and 4).** About $150 billion in U.S. Treasury bonds are held by foreign central banks, reflecting the dollar's role as the world's prime reserve currency. Nonofficial investors actually "underweight" U.S.

Chart 2

*International portfolio diversification**



*Nonresident holdings of bonds and equities as percent of total outstandings of these assets in eleven major countries.

*The great majority are central government bonds, as local government bonds are generally less liquid and are frequently tailored to domestic investors. U.S. state and local government bonds, for example, are not attractive to foreign investors because their tax-exempt status keeps their yields below those on U.S. Treasury bonds.

**Because of the broad coverage of these data, the outstandings and market shares may differ from other tabulations.

Table 3

*Government bond outstandings**

billions of dollars

	1983		1988	
	Global	Cross border	Global	Cross border
Australia	37	7	52	27
Belgium	41	6	111	14
Canada	104	51	183	94
France	32	1	151	12
Germany	70	7	248	76
Italy	98	2	394	16
Japan	466	27	1,228	44
Netherlands	25	8	80	28
Spain	6	0	41	1
United Kingdom	151	14	232	37
United States	707	91	1,392	236
Total	1 738	213	4,112	583

Table 4

*Government bond outstandings: market shares**

percent

	1983		1988	
	Global	Cross-border	Global	Cross-border
Australia	2	3	1	5
Belgium	2	3	3	2
Canada	6	24	4	16
France	2	0	4	2
Germany	4	3	6	13
Italy	6	1	10	3
Japan	27	13	30	7
Netherlands	1	4	2	5
Spain	0	0	1	0
United Kingdom	9	7	6	6
United States	41	43	34	40
Total	100	100	100	100

*Shares of each country's government bonds in total outstandings and in total cross-border holdings of these bonds.

Treasuries in their portfolios, allocating only a quarter of their foreign government bond portfolios to them.

German, Dutch, Canadian, and Australian government bonds also are more heavily represented among cross-border holdings than in global market outstandings. Foreign holdings of German government bonds grew by a factor of eleven over the last six years, much more than can be explained by the growth in official holdings of DM assets, which tripled over this period, partly reflecting Germany's price stability and strong currency. The attraction of Dutch bonds to international investors is that they are generally perceived to be close substitutes for German bonds, and usually have higher yields. Investor interest in Canadian and Australian bonds stems from their relatively high current yields. Deregulation of the French, Italian, and Spanish government bond markets, meanwhile, is attracting new foreign investment, but because of the low bases from which they started, bonds issued in these markets are still relatively underrepresented in the cross-border portfolio.

Japanese government bonds are severely underweighted in cross-border holdings. At the end of 1988, Japanese government bonds made up only 8% of cross-border holdings of government bonds, down from the 12% average of the previous five years. This is considerably less than their 30% weight in world capitalization. In part this reflects the fact that Japanese investors themselves now account for more than a quarter of world cross-border investment in securities. In addition, many Japanese government bond issues are relatively illiquid.

Growing international diversification of fixed-income portfolios across the world implies that foreign investors are becoming more important players in most domestic capital markets, holding larger shares of outstanding bonds, financing growing portions of public-sector deficits, and more actively trading their investments. Given that bond markets differ considerably in size, however, large cross-border holdings of a country's bonds do not mean foreigners will dominate the local market. U.S. Treasuries, for example, make up a large portion of the cross-border portfolio, yet foreign investors hold a more moderate 17% share of the outstanding U.S. Treasury bonds (see Table 5).

Foreign penetration ratios — averaging 14% for the eleven countries — have risen in all countries except Belgium and Japan. Foreign investors hold less than 5% of outstanding government bonds in Japan, Italy, and Spain, and only 8% in France, although foreign investment has been rising significantly in recent years as the last three have deregulated their domestic bond markets. Foreign investors hold more than 30% of outstanding government bonds in the Netherlands and Germany, and more than half in Canada and Australia.

In terms of flows, rising foreign penetration of national government bond markets implies that foreign investors are taking up an ever-larger portion of the net increase in bonds outstanding in most countries. In the United States, for example, net purchases by foreigners accounted for over 20% of the increase in outstanding Treasury

Table 5

Foreign penetration of national government bond markets

nonresident holdings as percent of outstanding domestic and Eurobonds issued by each country

	1983	1985	1988
Australia	20	33	52
Belgium	14	14	12
Canada	49	52	51
France	3	2	8
Germany	10	17	31
Italy	2	4	4
Japan	6	6	4
Netherlands	33	28	35
Spain	0	0	2
United Kingdom	9	11	16
United States	13	14	17
Total	12	13	14

bonds from 1983 to 1988. In other countries, this ratio varied from nil in Japan, to more than 100% in Australia (see Table 6). Indirectly, foreign investors may actually be financing an even larger portion of public-sector deficits by investing in the private sector and freeing up domestic savings.

Foreign investors also have become active traders in government bonds, in some cases turning over their portfolios about as often as domestic investors (see Table 7). In the U.S. Treasury bond market, foreign investors on average turn over their holdings thirteen times a year, up from only three times in 1983, only slightly less than domestic investors, who show a turnover ratio of fifteen. In Germany foreign investors turned over their holdings four times in 1988, also only slightly less than domestic investors. For Japan, data are available only for the whole bond market (government plus private), and thus understate turnover for the more active government bond market. In 1988, foreign investors turned over their holdings almost three times, less than half as much as Japanese investors.

The J.P. Morgan Government Bond Index

Growing global investment makes precise and timely data on the risk, return, and other characteristics of government bond markets increasingly important. Market indices — measures of the overall performance of each market — are the foundation of informed investment decisions. They serve as a yardstick against which to compare portfolio performance, and are an important tool for asset allocation and risk control. Even the most active investor needs an index as a starting point, or neutral position, from which over- or underweighting decisions are made.

With these needs in mind J.P. Morgan has developed a new investment tool: the J.P. Morgan Government Bond Index. The J.P. Morgan index represents a significant improvement over existing indices. It is updated daily, permitting timely adjustment of portfolios in response to changing market conditions. It is "investable," focusing only on securities that are easily available to the international investor. It is flexible, with a rich array of subindices that can be tailored to the individual investor's needs. And it is precise and transparent. These indices not only serve as a guide to investors, but also are useful as indicators of interest rate levels and total returns in international financial markets.

Table 6

Net foreign purchases of government bonds

as percent of net new issuance

	1983-1988
Australia	143
Belgium	10
Canada	55
France	16
Germany	57
Italy	2
Japan	—2
Netherlands	36
Spain	3
United Kingdom	44
United States	21

Market indices: valuable tools for portfolio management

Bond market indices measure the changing value of fixed-income securities outstanding in a particular market, accounting for capital appreciation, accrued interest, and reinvestment of coupon payments. These indices provide up-to-date information on the risk, return, and interrelationships of different markets,

Table 7

Turnover of bond holdings

annual turnover divided by year-end holdings

	Investors	
	Domestic	*Foreign*
United States (Treasury bonds and notes)		
1983	7.7	2.8
1985	11.5	6.9
1988	14.9	13.1
Germany (all government bonds)		
1983	1.3	1.5
1985	2.2	2.2
1988	5.3	4.3
Japan (all bonds)		
1983	1.2	1.5
1985	5.7	2.3
1988	6.8	2.7

sectors, and maturities. They provide a standard for portfolio managers to compare their performance with an average for the market; serve as neutral allocation guidelines from which to under- or overweight relative to the market; can be tailored to specific investment objectives; and can be used to replicate the market's performance. In the United States, the majority of bond portfolio managers rely on indices for performance measurement and decision making. The practice is extensive in the United Kingdom, is spreading in Europe, and is becoming popular in Japan.

Measuring the performance of a portfolio manager against a market index is now an integral part of the international investment scene. An investment record against a widely accepted index has become the most important part of a portfolio manager's resume when competing for money to manage. Performance should be measured by more than simply comparing the portfolio's return with that of the total market index. Normally, a manager can achieve a higher return than the market by taking on more risk than the average in the overall market.* The growing awareness of the importance of risk control has led many investment sponsors to put limits on the amount of excess risk a manager is allowed to undertake.

More generally, a manager should be evaluated relative to the stated objectives and constraints of the fund. This can be done by comparing the fund's performance with that of a customized index that meets the risk, liquidity, maturity, and other long-run objectives of the fund. For example, a central bank would not want to evaluate its performance against a total market index, but might instead prefer an index comprised mainly of shorter-term and more liquid issues in the world's major reserve currencies. Similarly, investors venturing into the global arena for the first time may prefer an index that combines a high weight on their domestic issues with only the benchmark issues from a selection of other markets.

Market indices not only enable portfolio managers to compare their performance against the market, but are also useful to select securities and to allocate assets across broad markets. The "passive" investor uses the composition of the index to determine what securities to buy and sell. Rather than try to outsmart the market, such an investor tries to match the long-term performance of particular capital markets. An index investor, the purest form of a passive manager, tries to replicate the performance of the market index exactly. Index investing differs from a traditional buy-and-hold strategy, however, because it can involve active trading as investors regularly recalibrate their holdings to track the changing risk and return characteristics of the market they follow.

The appeal of passive investment strategies originally derives from studies showing that, in large part, U.S. financial markets are priced "efficiently," suggesting that it would not be possible systematically to outperform the market.** This appeal is also a

*In the United States, a standard way to adjust the return on a portfolio for risk taken is to deflate that portion of the return in excess of the market's by the standard deviation of this excess return.

**Despite a general presumption of market efficiency, finance specialists keep finding "anomalies" in U.S. markets, that is, pricing in particular markets not consistent with market efficiency.

response to the fact that about three-quarters of all U.S. fixed-income managers have underperformed the market over the last ten years, after transaction costs. Passive investors thus minimize the risk of falling short of the market return and avoid the higher turnover costs and fees associated with active management. Close to 15%, or $375 billion, of U.S. pension funds' investment in bonds and equities is indexed, with close to $70 billion in some type of bond index fund, up from almost nothing five years ago.

In the global context, the case for purely passive strategies is not as well established. Evidence on market efficiency outside the United States — particularly in smaller markets — is not conclusive. Even more, there is strong evidence that national markets are not priced efficiently *with respect to one another.* For example, numerous studies show that international interest rate differentials do not fully reflect expected exchange rate changes, suggesting differences in expected returns across countries have not been fully arbitraged away. The view that markets are priced efficiently within national borders but not across borders suggests a possible strategy of passive investment in national market indices, but active allocation of funds among national markets.

Passive international investment has some appeal for other reasons as well. A passive strategy could be a comfortable first move into international markets. Also, large investors sometimes feel that it is difficult for them to move funds aggressively in smaller markets. Using market capitalization as a basis for allocating funds within and between markets is one way to avoid this problem. So far, only an estimated $1 billion of U.S. pension funds has been committed to international government bond index funds. A bigger demand for these strategies seems to be coming from non-U.S. investors, particularly the Japanese and central banks.

Investors who follow active strategies also use market indices for asset allocation, as well as for other purposes. Active investors may use security analysis and economic or fundamental research to identify undervalued markets, sectors, and individual securities in an effort to outperform the market. An active investor will not duplicate the total market index, but uses the composition of the index as a "neutral" position from which decisions on over- or underweighting particular markets, sectors, and maturities are taken.

For managers who rely on asset allocation models, the indices' historical risk and return measures and market correlations are critical inputs for investment decisions. These statistical parameters along with asset-return forecasts determine the structure of the portfolios. They are also crucial to any initial analysis of the perceived benefits to international diversification. In particular, the lower the correlation between asset values in the home and foreign markets, the stronger the case for diversifying abroad.

A new bond index

To meet the growing need of international fixed-income investors for accurate and useful global bond indices, J.P. Morgan has developed a new index, the J.P. Morgan Government Bond

Table 8

Index composition

Market coverage	
Countries	Australia, Belgium, Canada, France, Germany, Italy, Japan, Netherlands, Spain, United Kingdom, United States
Bond types	Straight, put, call, sinking fund, purchase fund, extendibles, conversions, double-dated
Coupon	Fixed-rate only
Liquidity	Benchmark, actively traded, regularly traded; less active and illiquid bonds are excluded
Maturity	Minimum remaining maturity of 1 year; no perpetuals
Indices	
Types	Total, principal, and interest return
Maturity sectors	1-3, 3-5, 5-7, 7-10, 10+ years
Statistics	Yield, duration, convexity, remaining maturity, average coupon
Currency	Local currency, any base currency
Global aggregates	Select capitalization: benchmark, active, traded: weighted by market value Eligible market-cap: traded indices weighted by market size of eligible universe Nondomestic-currency index for each market: select capitalization by liquidity; eligible market-cap for traded indices Selected market/sectors with the client's own weights
Characteristics	
Base	December 31, 1987=100
Frequency	Daily back to December 31, 1985; monthly back to January 1, 1979 (only medium- and long-term bonds)
Pricing	Local market closing bid prices (fixings when appropriate)
Security weighting	Gross market value; net market value for principal return
Capital changes	Amounts outstanding updated at the beginning of the month
Reinvestment	Daily, fully invested in index

Index. The index focuses on government bonds because they are generally the largest and most liquid sector of the domestic bond markets. Government bond prices are used as a benchmark from which other fixed-income securities — both domestic and Euro — are generally priced. And government bonds are the most uniform instruments internationally, in the sense that in each country these securities enjoy the highest credit standing.

Returns and risks within global fixed-income portfolios depend in large part on currency and interest rate factors. Given the overriding importance of these factors in cross-border allocation decisions, multicurrency bond managers usually focus on government bond markets because they place a premium on liquidity and credit quality. Some see relatively limited gains in going beyond the higher quality instruments in each national market.

The J.P. Morgan Government Bond Index represents significant improvement over existing bond indices in at least four crucial respects. First, it measures a market composite of investable issues only, those in which an investor can deal in size at short notice and at acceptable bid-ask spreads. Second, the index is based on daily price quotations and exchange rates, and is available within hours of market closing. This permits ongoing reassessment of market conditions and changing cross-market correlations, and facilitates timely portfolio adjustments. Third, the index is precise and transparent: price data are carefully gathered and checked; exact local market conventions are observed in settlement and accrued interest calculations; and the associated index statistics, such as yield, duration, and convexity, are comparable across markets. Fourth, the index is disaggregated into over 700 subindices and statistics that can be combined to fit the country, currency, maturity sector, and liquidity preferences of investors. The coverage and full range of available subindices, as well as their essential characteristics, are summarized in Table 8.

The index covers eight major government bond markets with established appeal among international investors: Australia, Canada, France, Germany, Japan, Netherlands, United Kingdom, and United States. It also covers three smaller markets — Belgium, Italy, and Spain — that have developed a significant international following in the last few years as they offer high yields

Table 9

Profile of the J.P. Morgan Government Bond Index

November 1, 1989

		Australia	Belgium	Canada	France	Germany	Italy	Japan	Netherlands	Spain	United Kingdom	United States	Global
		CGSs	BGBs	Canadas	OATs, BTANs, EEs	Bund, Bahn Post, Kassen, Bobls	BTPs, CTOs	JGBs	DSLs	Bonos y obligaciones	Gilts	Treasuries	
Number of issues	Traded	23	13	39	30	52	8	42	37	7	25	142	418
	Active	16	6	22	17	29	4	10	21	3	25	21	174
	Bench	7	1	8	4	2	1	1	1	1	8	7	41
Par value ($ billion)	Eligible	23	83	93	136	180	88	536	94	26	157	1155	2571
	Traded	17	37	58	82	100	32	318	65	22	77	1071	1879
	Active	14	18	37	58	62	19	116	40	12	77	205	658
	Bench	7	2	15	18	5	9	14	2	7	30	71	181
Market value ($ billion)	Eligible	22	86	97	137	177	87	545	94	26	160	1268	2699
	Traded	16	38	60	82	99	32	325	66	21	78	1176	1995
	Active	13	18	38	58	61	19	115	40	12	78	215	668
	Bench	7	2	16	17	5	9	14	2	7	31	72	181
Market weight (percent)	Eligible	0.8	3.2	3.6	5.1	6.6	3.2	20.2	3.5	0.9	5.9	47.0	100
	Traded	0.8	1.9	3.0	4.1	5.0	1.6	16.4	3.3	1.0	3.9	58.9	100
	Active	2.0	2.6	5.8	8.6	9.2	2.8	17.3	5.9	1.8	11.8	32.3	100
	Bench	4.0	0.9	8.8	9.4	2.7	4.9	7.5	1.2	3.7	17.2	39.8	100
Coverage ratio*		75	45	62	60	56	37	60	70	82	49	93	74
Average coupon (percent)	Traded	12.6	8.9	10.0	8.9	6.5	12.5	5.5	7.1	11.6	10.7	9.7	8.8
	Active	12.5	8.1	9.6	8.9	6.5	12.5	4.9	6.9	12.2	10.7	8.6	7.9
	Bench	12.5	8.3	9.6	8.7	6.9	12.5	4.6	7.5	12.5	10.9	8.1	8.7
Average maturity (years)	Traded	5.5	5.4	8.7	7.8	6.5	3.2	6.5	5.8	2.7	8.5	8.3	7.6
	Active	5.7	6.8	8.6	9.3	7.6	3.1	8.0	7.1	2.6	8.5	8.3	7.9
	Bench	7.1	9.6	10.7	11.3	7.1	2.9	8.6	10.0	3.0	7.6	8.4	8.2
Yield** (percent)	Traded	14.2	9.1	9.5	9.1	7.3	13.6	5.4	7.6	13.9	10.6	7.9	7.8
	Active	14.2	9.0	9.5	9.0	7.3	13.6	5.3	7.5	13.9	10.6	7.9	8.0
	Bench	13.9	9.0	9.4	8.9	7.2	13.5	5.3	7.5	13.9	10.7	7.9	8.7
Duration (years)	Traded	3.6	4.2	5.2	5.1	5.2	2.5	5.3	4.7	2.2	5.2	4.7	4.8
	Active	3.7	5.2	5.2	5.8	5.9	2.4	6.5	5.5	2.1	5.2	4.7	5.2
	Bench	4.4	6.7	6.1	6.7	5.6	2.3	7.0	7.4	2.4	4.7	4.9	5.1
Convexity (percent)	Traded	19.3	23.0	43.8	39.5	34.6	7.6	37.2	29.5	6.0	40.8	46.4	41.4
	Active	20.0	31.8	44.0	48.7	42.9	7.1	49.3	38.6	5.4	40.8	46.4	42.8
	Bench	26.5	52.3	57.9	62.0	39.3	6.3	56.3	63.4	6.5	34.5	47.7	43.9

*Coverage ratio is defined as the traded market value divided by the total market size (eligible universe).
**Yields: annual for Belgium, France, Germany, and Spain; annual equivalent life for Netherlands; semiannual for all others.

and display low correlations with certain other markets, particularly with the U.S. market, thus providing attractive diversification opportunities. The Swiss government bond market is excluded from the index universe because of stale prices and bond unavailability. Other markets will be added in the future as they gain liquidity and provide opportunities for further diversification. Table 9 provides a convenient profile of the entire index universe.

The J.P. Morgan index is useful not only as an investment tool, but as an indicator of developments in international bond markets. Thus, the index's total return measures and yield statistics

Table 10
Eligible universe

Markets	Eligible instruments	Excluded	Special features
Australia	Commonwealth issues	Index-linked	Reopenings
Belgium	State and Road Fund issues, including OLOs		Callables, putables, purchase funds, dual coupons, reopenings
Canada	Canadian governments		Reopenings, purchase funds
France	OATs, BTANs, Emprunts d'Etat	Index-linked, perpetuals, FELINs, ORTs, FRNs	Extendibles, sinking funds, reopenings
Germany	Bunds, Bahn, Post (Anleihen); Kassenobligationen; Bundesobligationen		
Italy	BTPs, CTOs	CCTs, CTEs	Putables
Japan	10- and 20-year JGBs; 2-, 3-, and 4-year medium-term notes	Private placements, medium-term discounts	Callables, reopenings
Netherlands	Dutch State Loans	Perpetuals, private placements	Sinking funds, callables
Spain	Bonos and Obligaciones		Callables, putables, reopenings
United Kingdom	Gilts, including convertibles	Index-linked, irredeemables	Double dates, reopenings, conversion stocks
United States	Treasury notes and bonds	Flower bonds, STRIPs, foreign-targeted issues	Callables, reopenings

will henceforth be included in the regular statistical appendix of *World Financial Markets*. The special appendix to this issue provides a detailed listing of country and global total return indices since December 31, 1985.

Focus on Investable Instruments

Within each market, the J.P. Morgan index includes only instruments that are truly accessible to international investors. This first stage of index screening is designed to insure that each "eligible" instrument is at least potentially attractive to international investors. Only fixed-rate issues that are tradable and redeemable for cash are included. Also, the security must not appeal exclusively to certain classes of domestic investors for local tax or regulatory reasons. Thus, index-linked issues and floaters, perpetuals or irredeemables, private placements, and special instruments such as flower bonds in the United States and medium-term discounts in Japan are all excluded (see Table 10).

The second, and equally important, stage of screening is to insure that each eligible issue meets certain liquidity criteria: in essence, it must be regularly traded in size at acceptable bid-ask spreads. This assures that investors can "replicate" the return on the index. J.P. Morgan professionals in each market apply the liquidity guidelines shown in Table 11 to separate all eligible issues into four increasingly broader categories: benchmark, active, traded, and eligible. Then indices are built to track the benchmark, active, and traded issues. Overall, about 7% of eligible U.S. Treasuries and almost half of eligible non-U.S. government bonds are excluded because of thin trading and unreliable pricing (see Table 12).

Trading activity often dictates which issues to include. In the German government bond market, for example, *Bundesanleihen* are considered liquid enough among the medium- and long-term issues, while *Bundesobligationen* are the most liquid of the short maturities. Although the

Table 11
Liquidity guidelines

Benchmark issues
- Widely recognized market indicator
- Issue with high trading volume
- Recent sizable issue
- Current coupon issue
- Often latest or most recently reopened issue
- Usually only one in any given maturity sector

Active issues

Benchmark issues plus other issues
- With significant daily turnover
- That may have been a benchmark earlier
- That are actively quoted side issues
- So that the universe spans the yield curve

Traded issues

Active issues plus other issues
- With prices changing regularly
- For which a two-way market exists
- That are available for investment

Table 12

Aggregate market value of eligible universe

billions of dollars, November 1, 1989

	Traded issues	Eligible issues	Traded as % of eligible
Australia	16	22	75
Belgium	38	86	45
Canada	60	97	62
France	82	137	60
Germany	99	177	56
Italy	32	87	37
Japan	325	545	60
Netherlands	66	94	70
Spain	21	26	82
United Kingdom	78	160	49
United States	1176	1268	93
Non-United States	819	1431	57
Global	1995	2699	74

Table 13

Bid-ask spread by liquidity

basis points

	Benchmark	Active less benchmark	Traded less active	Rest of market
Australia	8	14	20	160
Belgium	10	18	25	40
Canada	10	15	25	65
France	10	18	25	40
Germany	5	10	15	30
Italy	5	6	13	30
Japan	8	18	20	50
Netherlands	8	14	20	75
Spain	5	10	15	75
United Kingdom	6	11	16	35
United States	3	4	6	13
Non-United States	8	13	20	45

same criteria are generally applied in each country, variations across markets exist. For example, a benchmark bond in the Japanese market and one in another market may not be identical in terms of the criteria in Table 11. The assignments, although appropriate and uniform in the context of a single national market, must be regarded as comparable rather than strictly identical in a global context.

Illiquid issues are excluded from the index for a number of reasons. For one, transactions in these issues are often time consuming and involve wide bid-ask spreads, making transactions difficult and expensive. As the share of illiquid issues in an index rises, the transaction costs associated with portfolio turnover increase dramatically (see Table 13). In addition, the inclusion of illiquid issues can bias the measurement of the return and risk profile of the investable market. Price quotations are not dependable: they are either stale, unrealistically "matrix-priced," or not indicative for large transactions. These factors can result in "price runs" with identical prices reported over a period of time. Price runs distort measures of risk and return, understating risk estimates, and making portfolio strategies unreliable and costly.

Emphasis on liquidity, however, could be problematic if it entails numerous and frequent changes in the composition of the index. Generally, however, once a bond is deemed liquid it usually stays so. On average, a bond stays in the index for 48 months (see Table 14). To avoid excessive turnover in any market, a bond must stay in the index for at least six months. Therefore, analysts need not worry that a changing bond list would cause excessive changes in the statistical characteristics of the index. Likewise, index investors need not be concerned that changes in the bond list would necessitate excessive rebalancing.

Moreover, the J.P. Morgan indices are less expensive to track than other indices since the lower bid-ask spreads more than compensate for any additional turnover. For example, Table 15 summarizes the first year transaction costs for establishing and rebalancing a non-U.S. global index fund that tracks the index by fully replicating it. The all-in first year cost for a non-U.S. traded index is 22 basis points, about half the cost when fully replicating a total market index fund that includes illiquid issues.

Pricing, weighting, and settlement calculations

An index, however complex its calculations, is no better than the quality of the prices used in the formulas. For the J.P. Morgan Government Bond Index, each issue's net price is a closing transaction price supplied either by J.P. Morgan in its capacity as market maker, or by the local stock exchange's daily official fixing when appropriate.

For each of the eleven markets covered, the indices are first calculated in terms of local currency. To simplify the comparison of performance across markets in a common currency, the midpoint of bid and offer spot exchange rates corresponding to the daily London market close are used. During volatile periods in foreign exchange markets, however, time zone differences can introduce discrepancies on the order of a full percentage point or more in the calculation

Table 14

*Estimated average stay in the index**

months

	Traded universe		Total market
	Mean	Standard deviation	median
Australia	82	13	78
Belgium	40	18	56
Canada	42	19	66
France	47	18	55
Germany	42	20	45
Japan	48	23	77
Netherlands	45	19	54
United Kingdom	64	26	96
United States	47	18	59
Non-United States	54	21	68
Global	48	19	64

*Italy and Spain are excluded from the estimates due to their recent inclusion in the index.

Table 15

Transaction costs for a non-U.S. index fund

basis points

	Start-up		Annual rebalancing	
	Traded*	Market**	Traded*	Market**
Australia	13.3	69.8	2.3	21.8
Belgium	20.8	30.9	11.5	10.1
Canada	18.0	23.4	5.7	8.6
France	18.5	26.4	4.5	9.1
Germany	12.0	20.0	5.5	5.4
Japan	19.0	35.0	4.8	7.6
Netherlands	17.4	43.3	5.5	13.0
Spain	7.2	44.2	6.4	15.2
United Kingdom	9.9	24.5	4.3	1.7
Non-United States	16.8	31.4	5.5	7.6

*Traded indices are weighted by market capitalization of traded universe.
**Market indices are weighted by total market capitalization.

of monthly currency returns. Although most investors prefer the London close as their standard, the J.P. Morgan index can be customized to use exchange rates taken at other times.

Carefully designed formulas are used to measure the precise change in the value of a bond portfolio on a daily basis. Each market index is calculated by multiplying the previous day's index value by one plus a weighted average of the returns on all bonds in the current day's index. The weights are the proportion of total market value on the previous business day accounted for by each bond and are called market-cap shares. These formulas neutralize the effects of changes in principal amounts and a changing bond list so that these events do not introduce an artificial profit or loss to the index.

On the first of each month the index is adjusted to account for changes in the amounts of outstanding bonds due to new issues, purchase and sinking fund redemptions, reopenings, buy-ins, reverse auctions, or STRIP activity. For example, adjusting for STRIPS (and reconstitutions) in the U.S. market lowered the weight for the long end by 4% for 1988. Ignoring these adjustments would have overstated the returns in the U.S. Treasury market by 30 basis points.

The index carefully treats ex-dividend rules and the timing of coupon payments; it is the only daily global index with detailed components that does so. Most indices ignore ex-dividend rules and only approximate accrued interest, the settlement dates for trades, and the timing of coupon receipts. Depending on the approximations used, the result can be significant errors in calculating index returns. J.P. Morgan's calculations use actual cash flows and precise measures of accrued interest, taking into account domestic settlement procedures and ex-dividend date conventions in each market. A comprehensive set of bond market calendars is used to adjust all future cash flows to fall on the appropriate business day, thereby providing a precise foundation for calculating "true" measures of value. The market algorithms for determining interest value dates and trade settlement dates are driven by these calendars as well.

The J.P. Morgan index assumes that coupons received during the month are immediately reinvested into the country or sector index in proportion to the latest market values of the constituents. Thus, each country or sector index is fully invested at all times, which is possible only because the index is based on daily price quotations and is recalculated daily. Monthly indices must assume that a coupon paid during the month is held as cash or reinvested at some arbitrary rate until the next index rebalancing date.*

Aggregation and available statistics

The J.P. Morgan *global* indices are weighted averages of the eleven country indices, using the appropriate market size as weights. The global benchmark index, for example, uses the daily market value of outstanding benchmark issues in each country as weights (see Table 9). In-

*The complete methodology for all calculations is set out in the *J.P. Morgan Government Bond Index: Technical Document.* Institutional investor clients interested in this document should contact J.P. Morgan's bond index specialists.

vestors who are accustomed to using total market size — including illiquid issues — as weights are provided this alternative. To avoid having unreliable price data on illiquid issues affect the index, for each country the change in total market value is calculated each day in proportion to the change in the market value of traded issues only.

One particular characteristic of the global index is that coupons are reinvested into the same currency market until the index is rebalanced at the beginning of the next month. In this way, an investor can construct a customized index from the same country indices used in a manner consistent with the standard global and international indices.

For the global indices and each subindex, statistics are calculated as shown in Table 9. Individual bond yield, duration, and convexity statistics are based on true internal rates of return with the actual time to each cash flow used in discounting back to the settlement date. Individual yields are reported on either a semiannual or annual basis, depending on market convention. The formulas account for bonds with serial redemption schedules (such as Dutch serial). When bonds have put or call options, the index calculations always assume the issuer or investor takes the option that is most advantageous.

Within-market averages for duration, convexity, and remaining life are computed as market-value-weighted averages of the individual statistics for all the bonds in the index. However, both yield and average coupon statistics are duration-weighted — each bond's market value is adjusted by the bond's duration divided by the duration of the index. This produces a close approximation of the "true" portfolio yield and average coupon. For across-market statistics, the same market-value-weighted formulas are used as for within-market statistics since most international investors are used to these simple aggregation schemes. However, while within-market yields are expressed on either a semiannual or an annual basis, depending on market convention, cross-market yields are reported on a consistent semiannual basis.

New tables for the statistical appendix

The J.P. Morgan Government Bond Index is useful not only to investors, but to anyone interested in world financial markets. With this in mind, government bond yields and total return indices are now included in the regular statistical appendix of this publication. The data are reported for the last business day of each month and for the most recent day and include all eleven countries. The yields are presented on a comparable semiannual basis, covering a range of maturities. Total return indices are reported for each country in both local currency and dollars. The global index covering all eleven countries and its non-U.S. component are also shown.

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J.P. Morgan Government Bond Index, 14

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Information herein is from sources considered to be reliable but is furnished without responsibility on the part of Morgan Guaranty Trust Company.

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J.P. Morgan Government Bond Index

Index of total return for traded bonds, December 31, 1987=100
end of month

	1988	1989										
	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov 15
In local currencies												
Australia	109.77	109.11	109.01	110.20	112.32	111.33	114.18	116.12	119.03	116.76	118.57	120.45
Belgium	108.72	109.17	108.47	109.07	110.61	110.95	111.71	112.44	113.23	113.05	112.08	112.06
Canada	109.08	110.60	108.74	110.15	113.12	115.95	119.09	120.94	119.67	118.98	121.87	122.40
France	116.24	116.53	114.23	116.37	118.41	118.70	120.02	123.16	123.58	121.63	121.54	121.89
Germany	105.23	104.32	103.05	104.00	104.97	104.52	106.17	107.64	107.04	106.50	106.23	105.10
Italy	111.62	112.05	112.54	113.27	114.98	115.98	117.33	118.79	120.28	121.59	122.37	122.69
Japan	105.89	105.73	104.53	104.62	104.76	104.32	103.92	105.95	106.12	106.09	104.87	104.43
Netherlands	106.06	104.89	103.26	104.20	104.84	103.82	105.80	107.11	106.96	106.47	106.33	105.36
Spain	109.73	110.47	110.87	111.75	112.72	113.54	114.64	115.79	117.24	118.44	119.22	119.41
United Kingdom	106.74	109.56	109.04	109.58	110.04	108.91	109.97	114.11	114.20	112.18	113.51	113.42
United States	106.78	108.08	107.23	107.94	110.18	112.73	116.44	118.84	116.84	117.36	120.32	121.27
In dollars												
Australia	129.84	134.43	120.72	125.08	123.57	115.97	119.48	122.26	125.91	125.63	128.58	130.84
Belgium	96.23	91.23	93.25	90.23	92.22	88.26	89.97	94.65	90.76	94.52	95.61	95.74
Canada	118.89	121.44	117.85	119.98	123.97	124.99	129.38	133.16	132.13	131.34	134.92	135.70
France	102.22	97.12	97.91	96.78	99.10	94.18	96.29	103.85	99.13	101.81	103.65	103.51
Germany	93.36	87.22	88.71	86.06	87.62	82.98	85.35	90.71	85.46	89.21	90.68	89.48
Italy	98.97	94.95	97.21	94.50	96.83	93.94	96.26	102.92	99.14	103.15	105.14	105.10
Japan	102.63	98.24	99.71	95.38	95.45	88.71	87.54	93.73	88.56	92.21	89.02	87.86
Netherlands	93.69	87.39	88.60	86.03	87.29	82.34	84.91	89.98	85.25	88.90	90.48	89.47
Spain	103.91	102.41	104.13	101.87	103.82	96.80	99.11	106.37	102.73	106.84	109.76	109.56
United Kingdom	102.47	101.79	100.87	97.93	98.57	90.83	90.53	100.71	94.97	96.12	95.10	94.98
United States	106.78	108.08	107.23	107.94	110.18	112.73	116.44	118.84	116.84	117.36	120.32	121.27
Global	105.43	104.46	104.31	103.45	105.16	104.14	106.52	110.80	107.58	109.32	110.74	110.94
Global excluding United States	102.09	98.15	98.86	96.00	97.05	91.44	92.16	98.55	93.84	96.94	96.47	95.78

Government bond yields

by maturity sectors in years, for traded bonds included in the J.P. Morgan Government Bond Index
in percent per annum (semiannual basis), at end of month

	1987	1988	1989										
	Dec	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov 15
Australia													
1-3	11.38	13.78	14.51	14.91	14.95	14.67	15.44	15.00	14.78	14.43	15.48	15.49	15.07
3-5	11.97	13.71	14.36	14.66	14.62	14.37	15.06	14.47	14.28	13.88	14.82	14.68	14.33
5-7	12.51	13.34	13.77	14.10	14.14	13.92	14.45	14.08	13.92	13.52	14.38	14.28	14.02
7-10	12.89	13.08	13.45	13.76	13.82	13.56	14.10	13.75	13.62	13.10	13.91	13.79	13.53
10+	12.98	13.00	13.36	13.61	13.59	13.34	13.86	13.45	13.34	12.93	13.65	13.50	13.23
Belgium													
3-5	7.91	7.82	7.93	8.30	8.40	8.20	8.37	8.39	8.36	8.30	8.62	9.08	9.25
5-7	8.09	8.00	8.05	8.35	8.38	8.20	8.25	8.24	8.24	8.26	8.42	8.81	8.87
Canada													
1-3	9.75	10.60	10.61	11.59	11.51	10.81	10.46	9.87	9.71	10.33	10.34	10.07	10.38
3-5	9.84	10.38	10.29	11.07	10.99	10.35	10.02	9.54	9.30	9.88	10.10	9.91	9.90
5-7	10.08	10.24	10.18	10.77	10.67	10.16	9.77	9.38	9.16	9.64	9.95	9.64	9.58
7-10	10.03	10.22	10.09	10.61	10.53	10.11	9.72	9.32	9.17	9.56	9.83	9.55	9.50
10+	10.12	10.21	10.03	10.37	10.28	10.02	9.74	9.42	9.27	9.50	9.78	9.40	9.38
France													
1-3	9.10	8.16	8.46	9.13	8.77	8.54	8.75	8.77	8.40	8.48	8.94	9.18	9.30
3-5	9.40	8.32	8.51	9.17	8.89	8.61	8.76	8.75	8.28	8.39	8.88	9.20	9.17
5-7	9.60	8.26	8.41	8.98	8.72	8.53	8.65	8.60	8.15	8.25	8.75	8.99	8.94
7-10	9.69	8.38	8.48	8.99	8.77	8.52	8.62	8.52	8.14	8.23	8.64	8.75	8.78
10+	9.75	8.57	8.56	9.09	8.93	8.69	8.76	8.66	8.29	8.34	8.76	8.82	8.82
Germany													
3-5	4.85	5.87	6.39	6.91	6.77	6.72	6.96	6.80	6.58	6.86	7.15	7.40	7.62
5-7	5.71	6.21	6.54	6.91	6.82	6.76	7.01	6.81	6.60	6.85	7.07	7.27	7.55
7-10	6.25	6.44	6.60	6.87	6.85	6.75	6.92	6.70	6.55	6.77	6.95	7.09	7.36
Italy													
1-3	10.90	11.40	11.97	12.17	12.62	12.41	13.28	13.37	13.46	13.43	13.42	13.60	13.70
3-5	10.62	12.74	13.02	13.28	13.49	13.37	13.51	13.36	13.32	13.35	13.33	13.60	13.71
Japan													
1-3	3.82	3.88	3.95	4.52	4.68	4.72	5.08	5.09	4.98	5.00	5.23	5.64	5.92
3-5	4.09	3.94	4.07	4.60	4.70	4.73	5.00	5.16	4.93	5.00	5.15	5.55	5.74
5-7	4.38	4.04	4.20	4.59	4.72	4.75	4.88	5.13	4.84	4.90	4.99	5.33	5.49
7-10	4.84	4.62	4.67	4.85	4.90	4.96	5.11	5.25	4.92	4.97	5.05	5.33	5.42
10+	5.62	4.94	4.94	4.96	5.06	5.07	5.19	5.17	5.19	5.19	5.12	5.33	5.46
Netherlands													
1-3	5.13	5.99	6.46	7.15	7.02	7.03	7.39	7.15	7.00	7.21	7.45	7.79	8.05
3-5	5.89	6.07	6.53	7.07	6.95	6.94	7.30	7.05	6.87	7.06	7.34	7.53	7.81
5-7	5.99	6.13	6.56	7.02	6.97	6.94	7.31	7.01	6.84	7.02	7.27	7.42	7.73
7-10	6.23	6.34	6.63	7.03	7.00	6.98	7.32	7.00	6.87	7.02	7.20	7.36	7.62
Spain													
1-3	13.62	12.78	13.00	13.16	13.39	13.45	13.46	13.46	13.50	13.42	13.47	13.63	13.75
3-5	14.70	11.79	12.08	12.18	12.21	12.27	12.60	12.80	12.73	12.73	12.93	12.32	13.13
United Kingdom													
1-3	9.17	11.32	10.79	11.30	11.22	11.40	11.96	11.90	11.10	11.31	12.42	11.98	12.16
3-5	9.25	10.72	10.25	10.66	10.67	10.80	11.20	11.10	10.36	10.55	11.34	11.11	11.26
5-7	9.46	10.58	10.13	10.42	10.46	10.57	10.93	10.91	10.27	10.44	11.12	10.96	11.05
7-10	9.63	10.23	9.82	10.06	10.12	10.23	10.59	10.56	9.99	10.13	10.64	10.58	10.69
10+	9.67	9.79	9.52	9.72	9.81	9.79	10.12	10.09	9.64	9.76	10.15	10.15	10.24
United States													
1-3	7.69	9.14	9.12	9.57	9.77	9.24	8.84	8.11	7.62	8.40	8.46	7.92	7.71
3-5	8.19	9.15	9.11	9.50	9.64	9.15	8.77	8.10	7.58	8.35	8.43	7.91	7.76
5-7	8.50	9.19	9.08	9.44	9.48	9.11	8.71	8.12	7.67	8.33	8.40	7.95	7.81
7-10	8.76	9.18	9.03	9.37	9.35	9.06	8.66	8.14	7.78	8.31	8.37	7.97	7.86
10+	8.99	9.11	8.94	9.26	9.23	9.02	8.69	8.15	7.97	8.34	8.38	8.02	7.98

Historical total return indices — traded

Country indices in local currencies; December 31, 1987 =100.

	Australia	Belgium	Canada	France	Germany	Italy	Japan	Netherlands	Spain	United Kingdom	United States
Dec 31, 1985	70.01	78.87	81.71	83.17	87.61		85.77	86.20		77.65	84.54
Jan 31, 1986	72.84	79.47	81.24	84.42	88.21		85.65	86.33		77.17	85.04
Feb 28, 1986	75.25	80.74	84.10	88.47	90.33		87.52	87.26		80.58	88.74
Mar 31, 1986	79.55	84.29	88.45	92.77	91.61		88.89	89.36		86.51	92.19
Apr 30, 1986	81.93	88.76	88.65	95.94	93.59		89.27	90.48		88.61	92.67
May 30, 1986	81.78	87.21	87.38	95.93	92.05		87.78	90.00		87.72	90.41
Jun 30, 1986	81.81	88.04	90.23	96.97	92.50		88.69	90.81		87.18	93.50
Jul 31, 1986	77.48	89.94	91.09	98.35	93.54		89.35	91.73		86.86	94.13
Aug 29, 1986	78.41	91.35	92.96	100.43	94.82		90.37	93.44		88.11	96.95
Sep 30, 1986	79.92	91.44	91.81	99.55	93.91		89.95	92.99		82.33	95.33
Oct 31, 1986	82.32	92.10	93.06	98.15	93.35		90.75	92.84		83.08	96.63
Nov 28, 1986	82.88	92.28	95.13	96.25	94.71		91.43	93.16		82.66	97.78
Dec 31, 1986	84.14	92.17	96.26	94.88	95.17		92.32	93.01		86.23	97.87
Jan 30, 1987	83.66	93.38	99.20	96.24	96.32		93.80	94.93		88.49	98.95
Feb 27, 1987	83.22	93.99	99.19	97.27	96.33		95.32	94.98		91.79	99.68
Mar 31, 1987	87.07	95.10	100.38	99.37	98.39		96.83	95.89		95.03	99.02
Apr 30, 1987	89.16	96.05	96.58	99.70	99.29		98.86	96.09		97.46	96.59
May 29, 1987	90.40	96.16	97.24	99.12	100.01		99.03	96.79		98.53	96.23
Jun 30, 1987	92.34	96.84	98.04	98.23	98.27		96.25	96.47		97.06	97.33
Jul 31, 1987	93.27	98.10	95.80	98.04	97.61		94.89	96.43		94.59	97.09
Aug 31, 1987	94.73	98.52	95.20	97.58	97.19		96.33	96.74		92.69	96.44
Sep 30, 1987	98.05	97.66	93.92	94.85	95.99		93.61	95.38		94.05	94.55
Oct 30, 1987	93.99	97.48	99.67	97.64	98.18		97.29	97.57		99.14	98.32
Nov 30, 1987	96.96	99.48	98.15	99.78	99.94		98.35	99.45		100.77	98.78
Dec 31, 1987	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Jan 29, 1988	102.80	101.96	104.46	103.95	100.65	100.51	101.11	101.37	102.14	101.72	103.23
Feb 29, 1988	103.72	103.99	105.34	106.28	102.57	101.46	101.62	102.63	103.95	103.03	104.29
Mar 31, 1988	106.52	104.11	104.64	105.60	102.92	102.53	102.53	103.47	105.07	105.01	103.26
Apr 29, 1988	108.85	104.82	103.93	106.60	101.93	103.16	103.25	103.23	104.80	104.48	102.67
May 31, 1988	105.79	104.20	105.06	108.52	101.64	104.02	102.01	103.28	107.12	105.08	101.89
Jun 30, 1988	108.67	105.45	106.57	110.57	102.06	104.94	101.19	102.84	107.39	103.51	104.13
Jul 29, 1988	109.39	105.18	105.99	110.58	101.12	105.53	101.48	102.47	108.18	104.30	103.47
Aug 31, 1988	110.46	105.11	104.96	110.05	101.84	106.26	100.16	103.07	109.22	102.97	103.61
Sep 30, 1988	110.16	106.61	107.50	113.04	103.80	107.55	101.81	104.81	108.00	105.64	105.90
Oct 31, 1988	111.25	107.94	109.79	114.96	106.06	109.29	104.42	106.34	109.07	107.91	107.65
Nov 30, 1988	110.64	108.10	108.80	114.97	105.48	110.57	105.63	106.15	109.61	105.63	106.40
Dec 30, 1988	109.77	108.72	109.08	116.24	105.23	111.62	105.89	106.06	109.73	106.74	106.78
Jan 31, 1989	109.11	109.17	110.60	116.53	104.32	112.05	105.73	104.89	110.47	109.56	108.08
Feb 28, 1989	109.01	108.47	108.74	114.23	103.05	112.54	104.53	103.26	110.87	109.04	107.23
Mar 31, 1989	110.20	109.07	110.15	116.37	104.00	113.27	104.62	104.20	111.75	109.58	107.94
Apr 28, 1989	112.32	110.61	113.12	118.41	104.97	114.98	104.76	104.84	112.72	110.04	110.18
May 31, 1989	111.33	110.95	115.95	118.70	104.52	115.98	104.32	103.82	113.54	108.91	112.73
Jun 30, 1989	114.18	111.71	119.09	120.02	106.17	117.33	103.92	105.80	114.64	109.97	116.44
Jul 31, 1989	116.12	112.44	120.94	123.16	107.64	118.79	105.95	107.11	115.79	114.11	118.84
Aug 31, 1989	119.03	113.23	119.67	123.58	107.04	120.28	106.12	106.96	117.24	114.20	116.84
Sep 29, 1989	116.76	113.05	118.98	121.63	106.50	121.59	106.09	106.47	118.44	112.18	117.36
Oct 31, 1989	118.57	112.08	121.87	121.54	106.23	122.37	104.87	106.33	119.22	113.51	120.32

Historical total return indices — traded

Country indices in local currencies; December 31, 1987 =100.

	Australia	Belgium	Canada	France	Germany	Italy	Japan	Netherlands	Spain	United Kingdom	United States
Jan 6, 1989	109.99	108.81	108.70	116.52	104.81	111.65	105.60	105.85	109.84	106.53	106.47
Jan 13, 1989	109.80	108.88	109.67	117.33	104.88	111.90	105.87	105.53	109.98	107.15	107.54
Jan 20, 1989	109.92	108.98	110.27	116.99	104.99	112.01	105.67	105.44	110.10	108.90	107.70
Jan 27, 1989	110.53	109.19	110.78	116.98	104.76	112.07	105.93	105.40	110.43	109.92	108.29
Feb 3, 1989	108.39	109.21	110.61	116.29	104.20	112.30	105.43	104.64	110.23	110.29	108.13
Feb 10, 1989	107.85	109.27	110.01	115.94	104.24	112.38	105.56	104.44	110.76	110.47	107.41
Feb 17, 1989	106.49	109.04	109.81	114.66	103.72	112.47	105.40	103.97	110.67	110.45	107.58
Feb 24, 1989	108.05	108.52	108.52	113.76	102.93	112.58	105.05	103.23	110.83	109.21	106.92
Mar 3, 1989	109.18	108.64	108.96	114.56	103.73	112.90	104.12	103.72	110.90	109.80	107.47
Mar 10, 1989	109.39	108.79	108.99	115.01	103.82	111.83	104.31	104.11	111.19	110.10	107.37
Mar 17, 1989	109.57	108.82	108.64	115.29	104.26	112.40	104.23	104.30	111.15	109.77	106.83
Mar 24, 1989	109.81	108.82	108.95	115.90	103.96	112.96	104.47	104.21	111.41	110.03	107.24
Mar 31, 1989	110.20	109.07	110.15	116.37	104.00	113.27	104.62	104.20	111.75	109.58	107.94
Apr 7, 1989	110.10	109.56	110.31	117.02	104.46	113.50	104.55	104.72	112.06	108.78	108.31
Apr 14, 1989	110.34	109.75	111.32	117.50	104.48	114.11	104.65	104.77	112.35	108.93	108.98
Apr 21, 1989	112.02	110.19	112.39	117.75	104.92	114.74	104.73	105.13	112.58	108.68	109.34
Apr 28, 1989	112.32	110.61	113.12	118.41	104.97	114.98	104.76	104.84	112.72	110.04	110.18
May 5, 1989	112.39	110.77	114.24	118.70	104.84	115.09	104.77	104.68	112.91	110.04	110.64
May 12, 1989	112.62	110.82	115.24	118.49	104.49	115.33	104.67	104.13	113.19	110.43	111.51
May 19, 1989	111.93	111.12	115.29	118.69	104.21	115.32	104.72	103.71	113.47	110.35	111.96
May 26, 1989	110.86	111.04	115.63	118.81	104.40	115.80	104.63	103.74	113.69	110.08	112.45
Jun 2, 1989	111.57	111.06	116.91	119.30	104.74	116.05	104.36	104.01	113.69	108.59	113.76
Jun 9, 1989	112.30	111.51	118.55	119.56	105.50	116.79	104.51	104.96	113.72	108.83	115.37
Jun 16, 1989	112.42	111.57	117.60	120.22	106.20	117.33	103.80	105.76	113.91	108.81	114.50
Jun 23, 1989	113.18	111.54	117.99	120.25	106.22	117.54	103.99	105.78	114.45	108.72	114.74
Jun 30, 1989	114.18	111.71	119.09	120.02	106.17	117.33	103.92	105.80	114.64	109.97	116.44
Jul 7, 1989	114.57	111.86	118.91	120.74	106.62	117.64	104.74	106.22	114.78	110.85	117.09
Jul 14, 1989	115.16	112.09	119.35	121.39	107.21	117.89	105.01	106.67	114.95	112.29	117.26
Jul 21, 1989	115.17	112.27	119.19	121.91	107.23	118.27	105.32	106.65	115.38	112.54	117.13
Jul 28, 1989	116.09	112.42	120.02	122.62	107.43	118.61	105.79	106.97	116.09	113.96	118.52
Aug 4, 1989	117.70	112.71	120.42	123.29	107.77	119.38	105.93	107.39	116.27	113.52	117.65
Aug 11, 1989	118.33	112.94	120.28	123.95	107.69	119.80	106.04	107.42	116.48	114.33	117.17
Aug 18, 1989	118.31	113.06	119.84	123.09	107.28	120.03	106.14	107.28	116.80	114.75	117.07
Aug 25, 1989	118.17	113.19	119.79	123.47	107.22	120.03	106.19	107.02	117.06	114.57	116.92
Aug 31, 1989	119.03	113.23	119.67	123.58	107.04	120.28	106.12	106.96	117.24	114.20	116.84
Sep 1, 1989	119.12	113.25	120.01	123.51	106.98	120.39	106.19	106.91	117.35	113.91	117.40
Sep 8, 1989	118.98	113.21	120.12	123.63	107.05	120.64	105.42	106.93	117.62	113.45	117.79
Sep 15, 1989	118.56	113.33	120.08	122.76	106.72	120.87	105.22	106.72	118.00	113.43	118.33
Sep 22, 1989	117.18	113.36	119.67	122.89	107.06	121.18	105.46	106.93	118.24	113.66	117.68
Sep 29, 1989	116.76	113.05	118.98	121.63	106.50	121.59	106.09	106.47	118.44	112.18	117.36
Oct 6, 1989	116.76	112.70	120.75	121.99	106.65	121.70	105.57	106.25	118.61	112.78	119.07
Oct 13, 1989	117.25	112.32	121.87	121.28	105.91	121.90	105.00	106.03	118.81	111.93	119.55
Oct 20, 1989	117.40	112.46	121.44	122.05	106.65	122.08	105.49	106.30	119.31	113.13	119.74
Oct 27, 1989	118.16	112.26	121.77	121.97	106.71	122.16	105.00	106.47	119.37	113.13	120.07
Nov 3, 1989	119.01	112.15	121.86	121.06	106.17	122.53	104.66	105.91	119.35	112.66	120.28
Nov 10, 1989	119.78	112.04	121.21	121.86	105.79	122.49	104.33	105.77	119.27	113.51	120.80
Nov 17, 1989	120.68	111.98	122.12	121.24	104.81	122.52	104.57	105.49	119.46	113.26	120.99

Historical total return indices — traded

Country indices in dollars; December 31, 1987 =100.

	Australia	Belgium	Canada	France	Germany	Italy	Japan	Netherlands	Spain	United Kingdom	United States	Global	Non-United States
Dec 31, 1985	66.13	51.59	75.86	58.31	56.19		51.85	55.22		59.52	84.54	72.42	56.76
Jan 31, 1986	72.16	52.92	74.11	61.30	57.91		53.91	56.44		57.76	85.04	72.91	57.26
Feb 28, 1986	72.96	58.05	76.89	68.69	63.67		58.73	61.25		61.91	88.74	77.15	61.94
Mar 31, 1986	78.48	57.42	82.38	68.90	61.33		60.59	60.16		67.47	92.19	80.21	64.50
Apr 30, 1986	83.78	65.71	83.70	73.77	67.63		64.42	64.91		72.68	92.67	82.72	69.15
May 30, 1986	81.08	60.19	82.07	68.87	62.09		60.88	60.75		68.49	90.41	79.61	65.15
Jun 30, 1986	76.49	64.11	84.88	73.67	66.16		65.70	64.86		71.07	93.50	83.19	69.18
Jul 31, 1986	63.89	67.97	85.77	76.99	70.16		70.32	68.68		68.56	94.13	84.79	71.79
Aug 29, 1986	66.14	70.84	87.14	80.37	73.36		71.15	72.09		69.73	96.95	87.00	73.27
Sep 30, 1986	69.53	71.16	86.00	79.88	72.81		70.62	71.80		62.97	95.33	85.21	71.38
Oct 31, 1986	73.06	70.42	86.93	77.44	71.02		67.24	70.34		61.89	96.63	84.82	69.07
Nov 28, 1986	74.66	73.65	89.37	79.20	75.32		68.36	73.75		62.80	97.78	86.28	70.89
Dec 31, 1986	77.44	75.20	90.62	78.35	77.76		70.73	75.69		67.72	97.87	87.36	73.21
Jan 30, 1987	76.52	79.80	96.22	83.80	82.51		73.94	81.07		71.01	98.95	89.64	76.95
Feb 27, 1987	77.90	81.15	96.66	85.09	82.77		75.34	81.26		75.28	99.68	90.69	78.41
Mar 31, 1987	85.10	83.83	99.93	87.95	85.74		80.56	83.27		81.05	99.02	92.41	83.05
Apr 30, 1987	86.80	84.57	93.83	88.69	87.01		85.27	83.46		85.96	96.59	92.56	86.36
May 29, 1987	89.42	83.70	94.48	86.70	86.05		83.28	83.17		85.08	96.23	91.70	84.89
Jun 30, 1987	92.09	84.12	95.66	85.89	84.58		79.45	82.98		83.22	97.33	91.32	82.49
Jul 31, 1987	90.07	83.66	93.81	84.39	82.46		76.70	81.42		79.82	97.09	90.24	80.12
Aug 31, 1987	93.49	85.64	93.77	85.54	84.10		82.19	83.58		80.18	96.44	91.28	83.56
Sep 30, 1987	97.02	84.03	93.09	82.43	81.93		77.53	81.39		81.22	94.55	89.08	80.81
Oct 30, 1987	87.94	88.59	98.49	88.50	89.25		85.09	88.64		90.48	98.32	94.10	87.74
Nov 30, 1987	94.52	95.22	97.48	95.24	95.79		90.09	95.30		97.75	98.78	96.59	93.33
Dec 31, 1987	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Jan 29, 1988	100.88	95.70	106.48	98.39	94.05	94.21	95.71	94.88	96.18	95.22	103.23	100.62	96.33
Feb 29, 1988	103.27	96.90	108.73	98.80	95.27	94.51	95.80	95.51	97.97	96.86	104.29	101.55	97.04
Mar 31, 1988	109.41	98.46	110.19	99.51	97.36	96.79	99.77	98.09	101.84	104.93	103.26	102.39	100.60
Apr 29, 1988	114.28	97.89	109.93	99.91	95.34	95.77	99.92	96.86	101.44	104.01	102.67	101.92	100.30
May 31, 1988	117.71	94.52	110.71	99.61	92.04	93.84	98.62	93.93	100.73	102.29	101.89	100.83	98.78
Jun 30, 1988	119.76	90.71	114.09	95.72	88.09	90.25	91.88	88.55	94.84	93.85	104.13	100.00	93.54
Jul 29, 1988	121.48	87.34	113.83	92.96	84.47	88.33	92.36	85.28	94.33	94.54	103.47	99.26	92.67
Aug 31, 1988	122.89	86.74	110.05	91.89	85.16	88.39	88.92	85.74	94.47	92.05	103.61	98.57	90.81
Sep 30, 1988	119.60	88.69	114.86	94.46	87.09	89.47	92.15	87.73	93.64	94.71	105.90	101.04	93.46
Oct 31, 1988	126.36	95.00	116.96	100.26	93.16	95.45	100.56	93.36	99.26	100.99	107.65	105.10	100.40
Nov 30, 1988	134.29	97.51	119.08	103.25	95.46	100.06	105.18	95.88	103.94	103.62	106.40	106.06	104.03
Dec 30, 1988	129.84	96.23	118.89	102.22	93.36	98.97	102.63	93.69	103.91	102.47	106.78	105.43	102.09
Jan 31, 1989	134.43	91.23	121.44	97.12	87.22	94.95	98.24	87.39	102.41	101.79	108.08	104.46	98.15
Feb 28, 1989	120.72	93.25	117.85	97.91	88.71	97.21	99.71	88.60	104.13	100.87	107.23	104.31	98.86
Mar 31, 1989	125.08	90.23	119.98	96.78	86.06	94.50	95.38	86.03	101.87	97.93	107.94	103.45	96.00
Apr 28, 1989	123.57	92.22	123.97	99.10	87.62	96.83	95.45	87.29	103.82	98.57	110.18	105.16	97.05
May 31, 1989	115.97	88.26	124.99	94.18	82.98	93.94	88.71	82.34	96.80	90.83	112.73	104.14	91.44
Jun 30, 1989	119.48	89.97	129.38	96.29	85.35	96.26	87.54	84.91	99.11	90.53	116.44	106.52	92.16
Jul 31, 1989	122.26	94.65	133.16	103.85	90.71	102.92	93.73	89.98	106.37	100.71	118.84	110.80	98.55
Aug 31, 1989	125.91	90.76	132.13	99.13	85.46	99.14	88.56	85.25	102.73	94.97	116.84	107.58	93.84
Sep 29, 1989	125.63	94.52	131.34	101.81	89.21	103.15	92.21	88.90	106.84	96.12	117.36	109.32	96.94
Oct 31, 1989	128.58	95.61	134.92	103.65	90.68	105.14	89.02	90.48	109.76	95.10	120.32	110.74	96.47

Historical total return indices — traded

Country indices in dollars; December 31, 1987 =100.

	Australia	Belgium	Canada	France	Germany	Italy	Japan	Netherlands	Spain	United Kingdom	United States	Global	Non-United States
Jan 6, 1989	131.45	93.97	118.20	100.15	90.66	97.32	101.03	91.29	102.84	100.59	106.47	104.46	100.27
Jan 13, 1989	131.96	93.48	119.02	100.20	90.14	96.66	101.46	90.35	103.20	101.34	107.54	105.13	100.39
Jan 20, 1989	132.97	92.85	120.44	99.29	89.57	96.34	100.05	89.66	102.95	102.43	107.70	104.94	99.75
Jan 27, 1989	133.70	91.69	121.25	98.06	88.07	95.39	99.13	88.33	103.35	102.46	108.29	104.91	98.90
Feb 3, 1989	131.70	91.05	121.31	96.68	86.92	94.90	98.44	86.99	100.66	101.81	108.13	104.42	98.02
Feb 10, 1989	132.35	91.53	120.53	96.85	87.43	96.02	99.22	87.89	102.89	102.31	107.41	104.28	98.57
Feb 17, 1989	121.61	92.93	119.97	97.53	88.58	96.97	101.32	88.55	103.89	104.08	107.58	104.97	99.90
Feb 24, 1989	123.35	93.28	117.69	97.48	88.67	96.98	100.73	88.58	103.74	101.53	106.92	104.35	99.32
Mar 3, 1989	122.96	92.40	118.58	97.32	88.37	96.32	98.66	88.09	103.66	100.23	107.47	104.15	98.22
Mar 10, 1989	124.45	91.59	118.14	96.85	87.50	94.87	97.56	87.45	102.90	100.26	107.37	103.76	97.46
Mar 17, 1989	124.86	90.97	118.04	96.51	87.19	94.66	95.85	86.99	102.11	99.77	106.83	103.06	96.55
Mar 24, 1989	125.90	91.07	118.94	97.20	87.03	95.06	96.21	87.12	102.88	100.35	107.24	103.45	96.91
Mar 31, 1989	125.08	90.23	119.98	96.78	86.06	94.50	95.38	86.03	101.87	97.93	107.94	103.45	96.00
Apr 7, 1989	123.11	91.51	120.23	98.17	87.33	95.64	95.49	87.33	103.30	97.85	108.31	103.91	96.57
Apr 14, 1989	123.92	91.62	122.10	99.13	87.97	96.72	96.05	87.95	103.65	98.53	108.98	104.59	97.26
Apr 21, 1989	123.30	93.50	123.21	99.79	89.02	97.84	96.42	88.91	104.86	98.69	109.34	105.09	97.92
Apr 28, 1989	123.57	92.22	123.97	99.10	87.62	96.83	95.45	87.29	103.82	98.57	110.18	105.16	97.05
May 5, 1989	124.42	91.55	125.45	98.47	86.61	96.23	94.41	86.27	102.89	97.63	110.64	105.08	96.26
May 12, 1989	122.02	90.80	126.10	97.24	85.49	95.72	93.20	85.07	102.10	97.38	111.51	105.14	95.28
May 19, 1989	118.30	88.38	125.83	94.43	82.83	92.93	91.23	82.28	98.90	94.43	111.96	104.37	92.94
May 26, 1989	114.13	87.93	124.96	93.95	82.48	93.48	89.70	81.83	97.51	92.78	112.45	104.17	91.86
Jun 2, 1989	117.58	89.26	126.18	96.01	84.42	95.14	89.59	83.70	98.45	91.98	113.76	105.27	92.63
Jun 9, 1989	115.69	87.27	128.27	93.43	82.43	93.02	86.44	81.93	94.04	89.50	115.37	105.04	90.22
Jun 16, 1989	117.33	88.21	127.68	95.31	84.33	94.44	86.90	83.91	95.74	89.09	114.50	104.97	91.11
Jun 23, 1989	120.65	90.64	128.49	97.13	85.94	96.82	90.82	85.47	99.07	90.35	114.74	106.32	93.75
Jun 30, 1989	119.48	89.97	129.38	96.29	85.35	96.26	87.54	84.91	99.11	90.53	116.44	106.52	92.16
Jul 7, 1989	121.95	93.71	129.80	100.91	89.23	100.09	90.89	88.67	103.97	95.62	117.09	108.60	95.86
Jul 14, 1989	120.23	92.37	130.15	99.66	88.08	98.61	90.41	87.46	103.36	95.76	117.26	108.36	95.16
Jul 21, 1989	119.45	92.52	130.39	100.18	88.19	99.50	89.78	87.49	103.32	96.70	117.13	108.27	95.10
Jul 28, 1989	120.35	93.50	131.73	102.20	89.46	101.25	91.80	88.85	105.52	99.68	118.52	109.89	96.97
Aug 4, 1989	124.29	93.36	132.84	101.97	89.05	101.46	91.92	88.54	104.74	97.05	117.65	109.34	96.75
Aug 11, 1989	124.40	91.59	132.96	100.36	86.89	99.50	90.24	86.50	102.94	95.90	117.17	108.34	95.14
Aug 18, 1989	124.24	91.03	132.26	99.08	85.96	99.07	89.99	85.86	102.56	95.25	117.07	108.03	94.57
Aug 25, 1989	124.13	91.06	132.72	99.42	85.84	99.39	89.50	85.54	102.70	95.37	116.92	107.87	94.40
Sep 1, 1989	125.30	90.16	131.99	98.49	84.87	98.37	88.22	84.67	101.99	94.07	117.40	107.66	93.33
Sep 8, 1989	126.11	89.63	131.23	97.99	84.33	97.97	86.86	84.11	102.23	92.64	117.79	107.43	92.39
Sep 15, 1989	127.25	89.69	131.61	97.57	84.39	98.14	86.38	84.19	101.61	93.22	118.33	107.67	92.26
Sep 22, 1989	127.18	91.44	131.70	99.21	86.20	100.07	87.62	85.90	104.11	94.94	117.68	107.99	93.71
Sep 29, 1989	125.63	94.52	131.34	101.81	89.21	103.15	92.21	88.90	106.84	96.12	117.36	109.32	96.94
Oct 6, 1989	126.70	93.56	133.47	101.90	88.48	101.90	89.52	87.76	106.11	95.86	119.07	109.63	95.55
Oct 13, 1989	124.92	94.22	134.93	100.55	87.89	101.84	88.85	87.73	105.88	92.97	119.55	109.61	94.92
Oct 20, 1989	125.35	94.78	134.44	102.89	90.13	103.64	89.71	89.50	108.21	95.28	119.74	110.36	96.33
Oct 27, 1989	127.46	96.17	134.72	104.48	91.54	105.23	89.82	91.04	109.32	94.85	120.07	110.86	97.02
Nov 3, 1989	128.56	95.29	135.09	102.89	90.28	104.93	88.58	89.79	109.92	93.87	120.28	110.49	95.97
Nov 10, 1989	130.44	94.21	135.82	102.64	89.08	104.53	88.15	88.83	109.06	94.89	120.80	110.60	95.61
Nov 17, 1989	130.80	95.33	135.70	103.00	89.32	104.88	89.24	89.62	108.72	94.34	120.99	110.68	95.56

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